

AMENDMENTS TO THE CLAIMS

Listing of the claims:

Following is a listing of all claims in the present application, which listing supersedes all previously presented claims:

1. (Currently Amended) An electronic camera that does not use a mechanical shutter, comprising:

a MOS type solid-state image pickup device comprising (i) a semiconductor substrate, (ii) a number of photoelectric conversion elements formed in one surface of said semiconductor substrate in a matrix shape along a plurality of rows and columns, (iii) a switching circuit provided for each photoelectric conversion element and electrically connected to an corresponding photoelectric conversion element, each switching circuit controlling generation of an output signal representative of charge accumulated in said corresponding photoelectric conversion element and drainage of said charge, (iv) a row selection signal line disposed for each photoelectric conversion element row and electrically connected to corresponding switching circuits, each row selection signal line being supplied with a row selection signal for controlling generation of said output signal, (v) a plurality of output signal lines each of which is corresponded to at least one pixel column and on each of which said output signal is generated, (vi) a reset signal line disposed for each photoelectric conversion element row and electrically connected to corresponding switching circuits, each reset signal line being supplied with a reset signal for controlling drainage of said charges, (vii) a readout row-shifter for sequentially supplying said row selection signal to each row selection signal line, (viii) a reset row-shifter for sequentially supplying said reset signal to each reset signal line,

and (ix) an output device electrically connected to each output signal line for sequentially generating and outputting image signals representative of said output signals;

an image signal processor for generating moving image data or still image data based on said image signals output from said MOS type solid-state image pickup device;

a still image indication signal generator for generating a still image indication signal for indicating image pickup of a still image;

a flashing device for emitting a flash in response to a reception of a predetermined signal; ~~or a flashing device mount for mounting said flashing device;~~

a moving image mode controller being connected to said MOS type solid-state image pickup device for continually controlling operation of said MOS type solid-state image pickup device, said moving image mode controller makes said MOS type solid-state image pickup device repeat (a) an image signal read operation of sequentially supplying said row selection signal from the readout row-shifter to a plurality of predetermined row selection signal lines for sequentially generating said output signals on each output signal line and (b) an electronic shutter operation of sequentially supplying said reset signal from the reset row-shifter to said reset signal lines corresponding to at least said rows to be subjected to said image signal read operation for sequentially draining said charges accumulated in the photoelectric conversion elements; and

a correcting still image mode controller being connected to said MOS type solid-state image pickup device for controlling operation of said MOS type solid-state

image pickup device in place of said moving image mode controller when said still image indication signal is made, wherein a flashing device operation signal for operating said flashing device is made in the state that said readout row-shifter and said reset row-shifter are not operated, an exposure time of each photoelectric conversion element is set equal to or shorter than a time duration including an issuance time of said flashing device operation signal and necessary for performing two image signal read operations before and after one electronic shutter operation, and after a lapse of said exposure time, said correcting still image mode controller makes said MOS type solid-state image pickup device perform an image signal read operation of sequentially supplying said row selection signal from the readout row-shifter to each row selection signal line for sequentially generating said output signals on each output signal line.

2. (Original) An electronic camera according to claim 1, wherein the image signal read operation by said moving image mode controller and the image signal read operation by said correcting still image mode controller include (i) operation of sequentially supplying said row selection signal from the readout row-shifter to a plurality of predetermined row selection signal lines for sequentially generating said output signals on each output signal line in the unit of a photoelectric conversion element row and (ii) operation of sequentially draining said charges accumulated in each photoelectric conversion element from which said output signal was generated, in the unit of a photoelectric conversion element row.

3. (Previously Presented) An electronic camera according to claim 1, wherein said correcting still image mode controller does not intercept the electronic shutter operation or the image signal read operation under execution when said still image indication signal is made, if there is the electronic shutter operation under execution when said still image indication signal is made, said correcting still image mode controller makes said MOS type solid-state image pickup device perform the image signal read operation following said electronic shutter operation and after a lapse in exposure time, and thereafter said flashing device operation signal is made.

4. (Original) An electronic camera according to claim 1, further comprising:
a non-correcting still image mode controller being connected to said MOS type solid-state image pickup device for controlling operation of said MOS type solid-state image pickup device in place of said moving image mode controller when said still image indication signal is made, wherein without making said flashing device operation signal, said non-correcting still image mode controller makes said MOS type solid-state image pickup device perform an image signal read operation of sequentially supplying said row selection signal from the readout row-shifter to each row selection signal line for sequentially generating said output signals on each output signal line; and
still image mode designating device for specifying beforehand a still image mode controller to be operated when said still image indication signal is made.

5. (Original) An electronic camera according to claim 4, wherein the image signal read operation by said moving image mode controller, the image signal read

operation by said correcting still image mode controller and the image signal read operation by said non-correcting still image mode controller include (i) operation of sequentially supplying said row selection signal from the readout row-shifter to a plurality of predetermined row selection signal lines for sequentially generating said output signals on each output signal line in the unit of a photoelectric conversion element row and (ii) operation of sequentially draining said charges accumulated in each photoelectric conversion element from which said output signal was generated, in the unit of a photoelectric conversion element row.

6. (Previously Presented) An electronic camera according to claim 4, wherein said correcting still image mode controller and said non-correcting still image mode controller do not intercept the electronic shutter operation or the image signal read operation under execution when said still image indication signal is made, if there is the electronic shutter operation under execution when said still image indication signal is made, said correcting still image mode controller and said non-correcting still image mode controller make said MOS type solid-state image pickup device perform the image signal read operation following said electronic shutter operation and after a lapse in exposure time, and thereafter said flashing device operation signal is made.

7. (Previously Presented) An electronic camera comprising:
a MOS type solid-state image pickup device comprising (i) a semiconductor substrate, (ii) a number of photoelectric conversion elements formed in one surface of said semiconductor substrate in a matrix shape along a plurality of rows and columns,

(iii) a switching circuit provided for each photoelectric conversion element and electrically connected to an corresponding photoelectric conversion element, each switching circuit controlling generation of an output signal representative of charge accumulated in said corresponding photoelectric conversion element and drainage of said charge, (iv) a row selection signal line disposed for each photoelectric conversion element row and electrically connected to corresponding switching circuits, each row selection signal line being supplied with a row selection signal for controlling generation of said output signal, (v) a plurality of output signal lines each of which is corresponded to at least one pixel column and on each of which said output signal is generated, (vi) a reset signal line disposed for each photoelectric conversion element row and electrically connected to corresponding switching circuits, each reset signal line being supplied with a reset signal for controlling drainage of said charges, (vii) a readout row-shifter for sequentially supplying said row selection signal to each row selection signal line, (viii) a reset row-shifter for sequentially supplying said reset signal to each reset signal line, and (ix) an output device electrically connected to each output signal line for sequentially generating and outputting image signals representative of said output signals;

an image signal processor for generating moving image data or still image data based on said image signals output from said MOS type solid-state image pickup device;

a still image indication signal generator for generating a still image indication signal for indicating image pickup of a still image;

a flashing device for emitting a flash in response to a reception of a predetermined signal, or a flashing device mount for mounting said flashing device;

a moving image mode controller being connected to said MOS type solid-state image pickup device for continually controlling operation of said MOS type solid-state image pickup device, said moving image mode controller makes said MOS type solid-state image pickup device repeat (a) an image signal read operation of sequentially supplying said row selection signal from the readout row-shifter to a plurality of predetermined row selection signal lines for sequentially generating said output signals on each output signal line and (b) an electronic shutter operation of sequentially supplying said reset signal from the reset row-shifter to said reset signal lines corresponding to at least said rows to be subjected to said image signal read operation for sequentially draining said charges accumulated in the photoelectric conversion elements;

a correcting still image mode controller being connected to said MOS type solid-state image pickup device for controlling operation of said MOS type solid-state image pickup device in place of said moving image mode controller when said still image indication signal is made, wherein a flashing device operation signal for operating said flashing device is made in the state that said readout row-shifter and said reset row-shifter are not operated, an exposure time of each photoelectric conversion element is set equal to or shorter than a time duration including an issuance time of said flashing device operation signal and necessary for performing two image signal read operations before and after one electronic shutter operation, and after a lapse of said exposure time, said correcting still image mode controller makes said MOS type solid-state image

pickup device perform an image signal read operation of sequentially supplying said row selection signal from the readout row-shifter to each row selection signal line for sequentially generating said output signals on each output signal line;

a third still image mode controller being connected to said MOS type solid-state image pickup device for controlling operation of said MOS type solid-state image pickup device in place of said moving image mode controller when said still image indication signal is made, wherein a flashing device operation signal for operating said flashing device is made in the state that said readout row-shifter and said reset row-shifter are not operated, an exposure time of each photoelectric conversion element is set longer than a time duration including an issuance time of said flashing device operation signal and necessary for performing two image signal read operations before and after one electronic shutter operation, and after a lapse of said exposure time, said third still image mode controller makes said MOS type solid-state image pickup device perform an image signal read operation of sequentially supplying said row selection signal from the readout row-shifter to each row selection signal line for sequentially generating said output signals on each output signal line; and

still image mode designating device for specifying beforehand a still image mode controller to be operated when said still image indication signal is made.

8. (Original) An electronic camera according to claim 7, wherein the image signal read operation by said moving image mode controller, the image signal read operation by said correcting still image mode controller and the image signal read operation by said third still image mode controller include (i) operation of sequentially

supplying the row selection signal to a plurality of predetermined row selection signal lines from the readout row-shifter for sequentially generating the output signals on each output signal line in the unit of a photoelectric conversion element row and (ii) operation of sequentially draining said charges accumulated in each photoelectric conversion element from which said output signal was generated, in the unit of a photoelectric conversion element row.

9. (Previously Presented) An electronic camera according to claim 7, wherein said correcting still image mode controller and said third still image mode controller do not intercept the electronic shutter operation or the image signal read operation under execution when said still image indication signal is made, if there is the electronic shutter operation under execution when said still image indication signal is made, said correcting still image mode controller and said third still image mode controller make said MOS type solid-state image pickup device perform the image signal read operation following said electronic shutter operation and after a lapse in exposure time, and thereafter said flashing device operation signal is made.

10. (Original) An electronic camera according to claim 7, further comprising:
a non-correcting still image mode controller being connected to said MOS type solid-state image pickup device for controlling operation of said MOS type solid-state image pickup device in place of said moving image mode controller when said still image indication signal is made, wherein without making said flashing device operation signal, said non-correcting still image mode controller makes said MOS type solid-state image pickup device perform an image signal read operation of sequentially supplying

said row selection signal from the readout row-shifter to each row selection signal line for sequentially generating said output signals on each output signal line; and

still image mode designating device for specifying beforehand a still image mode controller to be operated when said still image indication signal is made.

11. (Original) An electronic camera according to claim 10, wherein the image signal read operation by said moving image mode controller, the image signal read operation by said correcting still image mode controller, the image signal read operation by said third still image mode controller and the image signal read operation by said non-correcting still image mode controller include (i) operation of sequentially supplying the row selection signal from the readout row-shifter to a plurality of predetermined row selection signal lines for sequentially generating said output signals on each output signal line in the unit of a photoelectric conversion element row and (ii) operation of sequentially draining said charges accumulated in each photoelectric conversion element from which said output signal was generated, in the unit of a photoelectric conversion element row.

12. (Previously Presented) An electronic camera according to claim 10, wherein said correcting still image mode controller, said third still image mode controller and said non-correcting still image mode controller do not intercept the electronic shutter operation or the image signal read operation under execution when said still image indication signal is made, if there is the electronic shutter operation under execution when said still image indication signal is made, said correcting still image

mode controller, said third still image mode controller and said non-correcting still image mode controller make said MOS type solid-state image pickup device perform the image signal read operation following said electronic shutter operation and after a lapse in exposure time, and thereafter said flashing device operation signal is made.

13. (Original) An electronic camera according to claim 1, further comprising:
an auto iris for adjusting an amount of light incident upon said MOS type solid-state image pickup device,

wherein said correcting still image mode controller in operation further performs an exposure amount adjustment operation of adjusting said auto iris to reduce a difference between exposure amounts to be caused by a difference between an exposure time under a control of said correcting still image mode controller and an exposure time under a control of said moving image mode controller.

14. (Original) An electronic camera according to claim 4, further comprising:
an auto iris for adjusting an amount of light incident upon said MOS type solid-state image pickup device,

wherein said correcting still image mode controller and said non-correcting still image mode controller in operation further perform an exposure amount adjustment operation of adjusting said auto iris to reduce a difference between exposure amounts to be caused by a difference between an exposure time under a control of said correcting still image mode controller or said non-correcting still image mode controller and an exposure time under a control of said moving image mode controller.

15. (Original) An electronic camera according to claim 7, further comprising:
an auto iris for adjusting an amount of light incident upon said MOS type
solid-state image pickup device,

wherein said correcting still image mode controller and said third still image mode controller in operation further perform an exposure amount adjustment operation of adjusting said auto iris to reduce a difference between exposure amounts to be caused by a difference between an exposure time under a control of said correcting still image mode controller or said third still image mode controller and an exposure time under a control of said moving image mode controller.

16. (Original) An electronic camera according to claim 10, further comprising:
an auto iris for adjusting an amount of light incident upon said MOS type
solid-state image pickup device,

wherein said correcting still image mode controller, said third still image mode controller and said non-correcting still image mode controller in operation further perform an exposure amount adjustment operation of adjusting said auto iris to reduce a difference between exposure amounts to be caused by a difference between an exposure time under a control of said correcting still image mode controller, said third still image mode controller or said non-correcting still image mode controller and an exposure time under a control of said moving image mode controller.

17. (Original) An electronic camera according to claim 1, wherein said output device includes an analog output device for generating and outputting analog image

signals representative of said output signals and a digital output device for receiving said analog image signals, converting said analog image signals into digital image signals, and outputting said digital image signals.

18. (Original) An electronic camera according to claim 4, wherein the output device includes an analog output device for generating and outputting analog image signals representative of said output signals and a digital output device for receiving said analog image signals, converting said analog image signals into digital image signals, and outputting said digital image signals.

19. (Original) An electronic camera according to claim 7, wherein said output device includes an analog output device for generating and outputting analog image signals representative of said output signals and a digital output device for receiving said analog image signals, converting said analog image signals into a digital image signals, and outputting said digital image signals.

20. (Original) An electronic camera according to claim 10, wherein said output device includes an analog output device for generating and outputting analog image signals representative of said output signals and a digital output device for receiving said analog image signals, converting said analog image signals into digital image signals, and outputting said digital image signals.

21. (Previously Presented) An electronic camera according to claim 3, wherein said correcting still image mode controller makes said MOS type solid-state

image pickup device perform the image signal read operation following said electronic shutter operation and the lapse of said exposure time.

22. (Previously Presented) An electronic camera according to claim 6, wherein said correcting still image mode controller makes said MOS type solid-state image pickup device perform the image signal read operation following said electronic shutter operation and the lapse of said exposure time.

23. (Previously Presented) An electronic camera according to claim 9, wherein said correcting still image mode controller makes said MOS type solid-state image pickup device perform the image signal read operation following said electronic shutter operation and the lapse of said exposure time.

24. (Previously Presented) An electronic camera according to claim 12, wherein said correcting still image mode controller makes said MOS type solid-state image pickup device perform the image signal read operation following said electronic shutter operation and the lapse of said exposure time.